DESCRIPTIONS OF SOME NEW POLYNOIDÆ, WITH A LIST OF OTHER POLYCHÆTA FROM NORTH GREENLAND WATERS.

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The Polychæta of the Arctic regions have been so thoroughly studied and described by a host of able Scandinavian, Dutch, German, English and other European zoologists that the fauna ranks as one of the best known in the world. Although the shores of Greenland have been repeatedly ransacked, especially by the zoologists attached to various exploring expeditions, the waters washing the north and northwest borders of that island have been searched much less thoroughly than those to the south and east.

From the standpoint of geographical distribution it has, therefore, seemed desirable to publish a list of the species contained in three small collections from this region which I have recently had the opportunity of studying. The first consists mainly of well-known species of Polynoidæ collected by Dr. Benjamin Sharp, in the shallow waters of McCormick Bay, in July, 1891, while a member of the party accompanying Lieutenant Peary to Greenland. The second embodies the results of a few dredge hauls, also in McCormick Bay, made by the Peary Relief Expedition, under the command of Prof. Angelo Heilprin, in August of the following year. This collection is remarkable from the circumstance that, while it contains but twelve species, eleven of which are Polynoidæ, four are well characterized new forms. It indicates the richness of the polynoid fauna at this particular spot, and recalls the results of Hensen's study of the annelids of the Norwegian North Atlantic Expedition to the regions about Spitzbergen and Nova Zembla. In the following list this collection is indicated by the letters P. R. E. These two collections belong to the Academy of Natural Sciences of Philadelphia. The third collection was made under the direction of Prof. Ortmann of the Princeton University Expedition to North Greenland in July and August, 1899. It is more extensive, both in the number of species represented and in the extent of territory covered, which overlaps McCormick Bay, both north and

south, and extends from Godhavn to Cape Sabine, though few collecting stations were made south of Cape York. Some thirty species are comprised in this collection, mostly of forms well known from more southern waters; but several of them have not been previously recorded from North Greenland. None of the species are new, but it is noteworthy that several of the polynoids differ materially from the more typical representatives of their species which occur on the coasts of North America, of Norway, Scotland, etc. Although one cannot safely draw general conclusions from the small amount of material at hand, there seems to be a tendency for the elytra to become rougher and more spinous. In the list of localities, the numerals preceded by the letter O. indicate the dredging stations of this expedition. The collections of the Academy also include the few Polychæta remaining of those brought back from southern Greenland by Dr. Hayes in 1860–61, a list of which was published by Stimpson in the *Proceedings of the Academy of Natural Sciences of Philadelphia* for 1863. These also are enumerated in the following list.

Gattyana cirrosa (Pallas) McIntosh.

The elytra are rougher than those figured by Malmgren and McIntosh, the numerous papillæ being rough, horny, and spinous at the tip. The specimens from Cape York are covered with the "ochreous deposit" mentioned by McIntosh, which appears to be derived from the bottom soil. McCormick Bay, P. R. E.; Barden Bay, O. 45, 10–40 fath.; Cape York, O. 34, 10 fath.

Gattyana amondseni (Malmg.) McIntosh.

McCormick Bay, Dr. Benjamin Sharp; Payer Harbor, O. 17, 16 fath.

Gattyana senta sp. nov.

This species has the broad, thick-set form of *Harmothoë imbricata*, but is more depressed. Owing to the very spiny elytra and the dense bundles of dorsal bristles it presents a remarkably shaggy aspect. The type specimen is 22 mm. long, exclusive of the cephalic and caudal appendages, and has a maximum width between the tips of the longest setæ of 8.5 mm., of which the body itself forms about two-fifths. There are thirty-six setigerous somites. As viewed from below the body, exclusive of the parapodia, increases in breadth to X, from which it decreases very gradually to

XXX, and more rapidly to the anal somite. The fifteen pairs of elytra are borne on the same somites as in *Harmothoë imbricata* and allied forms.

The head (prostomium) is about two-thirds as long as broad, with the greatest width at about the middle. Anteriorly it is divided into two broadly rounded lobes by a median fissure which reaches as far as the posterior eyes; laterally it is strongly and posteriorly slightly convex, but normally the posterior margin is concealed by a median nuchal lobe of the succeeding somite. There are no anteriorly produced cephalic peaks.

Eyes, two pairs, conspicuous, black, circular, the posterior only visible from the dorsum. The anterior the larger, and situated on the ventro-lateral faces of the head about their own diameter from the anterior margin. The posterior dorsal close to the nuchal margin and separated by an interval of four times their diameter.

Exclusive of its base, which arises from the frontal fissure, the median tentacle has a length of about two and one-half times the width of the head, with a subterminal enlargement and a filamentous tip of about one-fifth its length. Except on the latter it bears rather long scattered cilia. The lateral tentacles arise from short and slender ceratophores from the anterior surface of the head at a lower level than the median tentacle, but, in the absence of anterior peaks, not very sharply demarcated from the cephalic lobes. Their diameter is about two-thirds, and length slightly more than one-half of the median tentacle. They are slender and taper continuously from base to apex, which is tipped by a delicate filament. A very few cilia similar to those on the median tentacle are present. Palps robust, with a basal diameter of rather more than one half the width of the head and a length about equal to the median tentacle. They taper rapidly, but not uniformly, to the acute tip, which bears a short filiform appendage. Numerous short, truncate cilia are borne on five longitudinal lines, of which two are nearer together on the medial aspect and the others respectively dorsal, external and ventral. Tentacular cirri similar to the notopodial cirri, ciliated like the median tentacle; the dorsal is slightly the longer.

Somite I is very narrow dorsally, but bears an unusually prominent median lobe which overlaps the head between the posterior eyes. The nephridial papillæ become distinct on IX, and continue

to the posterior end. They are short and directed dorsad. Anal cirri, one pair, similar to dorsal cirri, but more slender.

In the typical parapodium (Pl. XIII, fig. 1) the neuropodium and notopodium are distinctly separated; the former is much the larger and angular in outline, whereas the latter is rounded. Both terminate in acicular lobes, of which the neuropodial is the longer. The acicula are remarkable for the unusual length of the free, projecting end, which in the case of the neuropodial equals one-third of the length of the longest setæ, and is slender and curved.

The dorsal cirri spring from conspicuous cylindrical bases. They are larger than the median tentacle, with less of a subterminal enlargement and shorter filamentous tip. The numerous cilia are of two kinds; the largest have a length of two to three times the diameter of the cirrus, have a uniform diameter and are confined to the distal half, excluding the filamentous tip which bears no cilia; the smaller ones are enlarged at the end and are more widely distributed proximally. The ventral cirri are about one-fourth of the length of the dorsal, slender, awl-shaped, and bear a very few short clavate cilia.

The first elytra are circular and fixed nearly at the middle; the next succeeding ones ovoid, with a slight anterior emargination at the point of contact with the preceding peduncle; at the middle of the body they are reniform, while posteriorly they again approach the circular form. They are loosely attached and easily displaced and are of a soft membranous texture, with very hard horny spines (Pl. XIII, fig. 2). Around the entire uncovered margin is a fringe of rather widely separated cilia which become elongated externally. With the exception of a small antero-internal margin the entire surface is spinose, the spines as usual increasing in size and complexity and decreasing in number from the anterior and internal toward the posterior and external border. The first are merely low cones. They are succeeded by others with bifid summits which soon become larger. Passing obliquely across the middle of the scale in its longest direction is a broad band of prominent bifid spines, the apices of many of which are again divided. Most of the spines on the posterior half have, on the other hand, a quite distinct character. Here they are more remotely distributed and are mostly trifid, with broad bases and each limb usually bifid at the tip. Numerous other forms occur. Some have a central spine aris-

ing from the middle of the three diverging ones, others expand into an irregular disk, from which project from four to seven points of different sizes and shapes. But the most remarkable spines are those which protect the extreme posterior and external border of the scale. These are very large and tree-like in form, and most frequently branch in a fundamentally trifid, ternate plan, though some of the branches may be bifid or even simple. The final divisions are always acutely pointed.

Setæ of the dorsal and ventral fascicles are of approximately equal length and thickness. The former are somewhat stouter basally, but the latter are terminally, and their apices form a nearly regular outline, beyond which only one or two of the dorsalmost neuropodial setæ project. The very numerous notopodial setæ are arranged in many rows and radiate in all directions, but chiefly laterad and caudad, overlapping the following parapodium. Their form is characteristic. The anterior dorsalmost ones (Pl. XIII, fig. 3) are short, stout and strongly curved. They are about two-thirds free, with the inserted part suddenly contracted and narrow, and the thickest region at about the middle of the free portion. There is a very extensive spinous region, in which the rows of capillary spines are rather close and long. The short, smooth end, which is equal in length to the space of three or four of the terminal rows of spines, is peculiar in having an abruptly recurved or hooked tip (Pl. XIII, fig. 6). Toward the ventral end of the anterior row the setæ become less curved, more slender and the terminal hook less abrupt.

Posteriorly the setæ of succeeding rows become much longer, relatively more slender, and almost straight. A typical one is exhibited in Pl. XIII, fig. 4. Such setæ, which are very numerous, have the following characteristics: They are slender and taper regularly from the thickest point in the proximal third to the acute tip, which is slightly curved and sometimes suggests the hook of the dorsal setæ by the faintest indication of a recurvature. The spinous region is less extensive than on the dorsalmost setæ, and the spines are excessively fine, except toward the free end, where the elsewhere very close long rows become broken up into short detached plates, which alternate on the opposite sides of the seta. Proximally they again become irregular. In some cases these spinous rows actually encircle the setæ, but usually there are two intervals on opposite margins, that on the concave side being occupied by a

distinct longitudinal groove in which short transverse ctenoid plates are situated. The non-spinous basal portions of these setæ and the smooth interval on the convex border are covered with numerous minute granulations (Pl. XIII, fig. 8) which become less numerous and finally disappear distally.

The neuropodial setæ (Pl. XIII, figs. 9–13) are less characteristic. They are arranged in eight or nine horizontal rows and are less numerous and rather stouter than the notopodials, notably at the distal end, where their enlarged spinous portions contrast conspicuously with the attenuate tips of the former. From ventral to dorsal the spinous tips increase in length much more rapidly than the entire free portion of the setæ, these regions being as one to five or six in the ventral, and as one to three in the dorsal. The number of spinous rows is large, but varies only from twenty-three in the ventral to twenty-seven in the most dorsal. Distally the teeth are coarse and the rows rather widely separated, proximally they are fine and the rows crowded. The smooth tips are rather long, without accessory processes and on typical setæ strongly hooked and sharp-pointed. Probably as a result of wear, the tips of the prominent dorsal neuropodial setæ are blunt. On the second and third parapodia the neuropodial setæ are intermediate in form between the typical neuropodial and notopodial setæ just described; their tips are straight and slender, and the spines very long and few in number. The first foot bears a tuft of four or five of the notopodial type. At the posterior end the setæ show modifications from the type similar to the anterior.

Pigment, if originally present, has almost entirely disappeared. A general pale-yellow hue results from the dull yellow of the spines on the elytra, the hay color of the notopodial, and the rich amber of the neuropodial setæ.

Two specimens. McCormick Bay, P. R. E.

Gattyana ciliata sp. nov.

In ventral aspect the body is rather slender and nearly linear, and tapers very gently from about X to the posterior end. Dorsally it is strongly convex. The type consists of two imperfect individuals, one consisting of twenty-one anterior somites, the other of thirteen posterior somites, together constituting nearly the total number. These measure respectively 30 and 12 mm. long, so that length of a complete example of this size would probably be

about 45 mm. The width of the body alone at X is 4.8 mm., to the ends of the parapodia 11 mm., and to the tips of the setæ 16.5 mm. Apparently the elytra number fifteen pairs, borne on the usual somites. Segmental papillæ begin on V and soon become long and slender, but instead of pointing freely caudad, as in *Harmothoë imbricata* and allied forms, they are directed dorsad between the bases of the parapodia.

The head is broad, its length being about three-fourths of its greatest width, which is about one-third of its length from the anterior end. Its lateral margin is almost angulated; the anterior fissure is deep and wide, and the ceratophore of the median tentacle occupies it in such a way as to give the impression of having pushed apart the two lobes of the head. These lobes are rounded anteriorly and have no distinctly produced peaks.

The eyes are black, circular and widely separated. Those of the posterior pair are less than their own diameter from the posterior margin of the head and so far apart as to be partly laterad in position. The anterior are slightly larger, separated from the extreme anterior margin by less than their own diameter, and latero-ventral in position.

Median tentacle absent, its ceratophore of large size and marked by a conspicuous chocolate-colored band. Lateral tentacles arise at a level quite below the dorsal surface of the head lobes and partly overlapped by the ceratophore of the median tentacle. They have a length of about one and two-thirds the width of the head, are slender and tapering, with a brown pigmented subterminal enlargement and a rather long filiform tip. The single palpus remaining on the type specimen is an elongated, almost whip-like structure eight times as long as the head. It bears a single line of cilia on the medial side, while much shorter clavate cilia are scattered over the general surface. Its cuticle is remarkably iridescent, a condition not found elsewhere in this worm. Frontal ridge broad and low. The tentacular cirri are missing.

Typical parapodia are long and slender, the neuropodium prominent and bearing near its base the small lobe-like notopodium. The dorsal border of the former is straight and slopes gently downward, to pass without angulation into the dorsal edge of the acicular lobe, the base of which is met abruptly by the sharply upturned ventral margin. The aciculum projects but slightly.

The notopodium is merely a dorso-anterior lobe supported by a slender aciculum, which lies close to the neuropodial aciculum, but terminates far short of it. The large base of the dorsal cirrus, with its double wing-like lobes, further overshadows the notopodium. The cirrus itself has the usual form and bears numerous slender cilia, which, on the dorsal side, have a length nearly equal to the diameter of the cirrus and about four times that length ventrally. The ventral cirrus is about one-fifth the length of the dorsal. The first ventral cirrus (somite II) is, however, as usual larger and formed like the dorsal cirri; moreover, its ventral surface bears numerous truncate cilia as long as one-half its diameter.

Although few in number and arranged in only eight very definite rows, the neuropodial setæ, because of their large size and rich golden color, are very conspicuous. They increase in length to the sixth row, but their spinous ends continue to elongate to the most dorsal (8th) row. All are stout and have abruptly enlarged ends (Pl. XIII, figs. 17–19) with long, slightly curved, and rather blunt-pointed, smooth tips. The spinous region is remarkably short, particularly on the most ventral setæ, which bear only four pairs of coarse teeth and seldom a trace of lateral fringes. The middle setæ have six or seven pairs of such spines with short lateral fringes, and the dorsal setæ as many as fifteen or twenty rows of spines, of which the basal ones are very fine. The smooth tips of these dorsal setæ are relatively and absolutely shorter as well as more slender.

The notopodial setæ (Pl. XIII, figs. 14–16) are of a pale hay color and rather lustreless. They are extremely numerous and arranged in many nearly horizontal ranks, from which they spread fan-like in a nearly horizontal plane outward and slightly backward, so that these worms present none of that shaggy appearance which characterizes some Polynoidæ. These setæ are so long, so numerous and keep so well together, that the parapodia are scarcely visible from above. This species is distinguished from other species of the genus by the fact that all of the notopodial setæ, without exception, bear long capillary tips. The longer middle and ventral setæ are spinous for about one-third of their exposed length and become excessively slender toward the gently curved tip, which bears a smooth, tapering and flexible filament about one-fourth of the length of the spinous portion. The very numerous rows of fine

spines are about equidistant for the entire length, but increase in height to near the tip where they again diminish. The bristles present a very strongly serrated profile, especially at the point where the tapering shaft has a diameter less than the height of the projecting spines. The dorsalmost and ventralmost setæ are shorter and bear much shorter capillary tips; the former are also strongly curved and the latter straight and very slender.

Somite I has the parapodium supported by a single stout aciculum which passes between the bases of the dorsal and ventral tentacular cirri. It bears a tuft of four or five notopodial cirri of the extreme dorsal pattern. II bears a nearly normal tuft of notopodial and a small group of long-spined and slender neuropodial setæ.

A single elytron (the right one of somite VII) was found *in situ* on the type specimen, and is represented on Pl. XIV, fig. 20. It is narrow and strongly reniform, with the external half broader than the internal. Close to the anterior emargination, but rather to its external side, is the area of attachment. Closely placed cilia extend all around the posterior and external margin and increase in size and frequency from within outward, while here and there one or two of the larger cilia are replaced by much smaller ones. Coarser cilia are scattered sparingly over the greater part of the postero-external region, and, like the marginal ones, are longer externally.

With the exception of a very narrow antero-internal marginal area the entire surface bears numerous horny papillæ which, as usual, increase in size slightly, but decrease in number toward the posterior margin. In this case the papillæ or spines are of largest size and most numerous in a narrow area along the middle of the scale. Along this area their summits are distinctly thickened and bispinose. A line of tall, slender cylindrical ones with prominent bifid tips runs from the point of attachment of the scale to the outer margin, and a few similar ones are scattered elsewhere. Just in front of the posterior margin is a row of seven prominent conical papillæ with broad bases and truncate roughened summits. These are also covered with a horny cuticle, but appear to be softer than the small spines and papillæ, like which they are of a pale-brown color.

Three specimens. McCormick Bay, P. R. E.

Lagisca multisetosa sp. nov.

Like other species of *Lagisca* this is slender, with the widest part of the body far forward at somite VI, behind which it diminishes gently, while the anterior end is broadly rounded. The type specimen consists of the twenty anterior somites and measures 11 mm. in length, 3.2 mm. in width of body at VI, 5.3 mm. to tips of feet, and 8 mm. to tips of the setæ at the same place. It will be observed that the parapodia are here relatively short.

The head is three-fourths as long as wide, with a gently convex posterior border, lateral margins prominently bulged at the middle, and the anterior fissure deep, with a narrow furrow continuing it back to about the middle of the head. The two halves of the head are produced forward around the base of the middle tentacle, and the prominent peaks in which their outer sides end are widely separated from the latter. The frontal ridge is strong and high.

The posterior eyes are situated close to the posterior margin of the head and separated by four times their diameter. They are black, circular and look upward and slightly outward. The anterior eyes are of the same shape and color, but about twice the size of the posterior. They are situated relatively far back, not more than their own diameter in advance of the posterior pair, but on the ventro-lateral surface, though they may be seen through the tissue of the head from above.

Of the cephalic appendages the median tentacle is absent, but its deep chocolate-colored base remains. The lateral tentacles have a length about equal to the width of the head, and are slender and tapering, the distal half being filiform. They arise entirely below the level of the median tentacle and their bases are almost in contact in the median line. The palps are about two and one-half times the length of the lateral tentacles, taper to a very acute tip, and bear two dorsal lines of very small cilia, with a few of the same kind scattered over the surface. The dorsal tentacular cirrus about equals the palp in length; the ventral is slightly shorter. Both taper from the base to a very slight subterminal enlargement bearing a short terminal filament. Short truncate cilia are sparingly scattered over the surface, being rather more numerous just below the subterminal enlargement.

Although the setæ are long the parapodia themselves are short, the tenth, for example, being somewhat less than one-half the width

of the body. In shape the foot is easily distinguished from that of *Lagisca rarispina* by the much smaller notopodium. The neuropodium is broad, with a prominent acicular lobe, from the end of which, above the projecting aciculum, is produced a long, slender, tentacle-like process, quite as long as the lobe itself. The notopodial acicular lobe bears no such process, and is much shorter. The dorsal cirri resemble the tentacular cirri, except for the longer filiform tips and longer, more numerous and clavate cilia. Ventral cirri slender, reaching nearly to the end of the neuropodial acicular lobe and bearing a few very short, nearly globoid cilia.

Only the anterior elytra are present, and these have the normal arrangement as far as the tenth pair on somite XIX. The first is circular, five or six succeeding pairs (Pl. XIV, fig. 29) reniform, and the others ovate-reniform. They are thin, membranous, translucent and fairly adherent. The area of attachment is small, elliptical and very much nearer to the anterior and external borders than to the posterior and internal. A rather wide and clearly defined area internal to the hilum and along the anterior border is entirely free from spines. Anteriorly and internally the spines are low and nipple-shaped, but over most of the surface are sharply conical, becoming elevated and acute in certain regions, notably in a broad irregular band which passes across the middle of the scale in its long direction. Enlarged spines are also scattered singly or in groups here and there over the surface toward the posterior and external borders. Twelve or fifteen prominent soft papillæ (Pl. XIV, fig. 31) of various heights and with rounded summits appear just in advance of the posterior margin, and a few similar ones on other parts of the surface. Marginal cilia appear to be absent, but a few large ones are scattered over the surface in the external third. On the first scale soft papillæ extend more than half-way around the margin, and an area of particularly strong spines occurs above the area of attachment.

The neuropodial setæ (Pl. XIV, figs. 32–34) are long and slender, with very long and but slightly enlarged spinous regions. The smooth tips are very short; the principal point rather strongly curved, but not hooked; the accessory process far out, running first parallel to the principal point and then diverging from it, very slender, sharp-pointed and long. These setæ are very fragile and but few are found with the tips intact. The spines are long and

fine, except at the base. The number of rows varies from nineteen on the most ventral setæ to twenty-four or twenty-five on the middle and thirty-one on the most dorsal. The neuropodial setæ are arranged in numerous rows, there being at least twelve subacicular and six supraacicular series.

The notopodial setæ (Pl. XIV, figs. 35, 36) are also rather long and slender, gently and regularly curved and tapering to the rather acute points. As usual in *Lagisca*, the rows of spines are long, numerous and close, the spines themselves being fine and a few in the middle of each row enlarged.

The neuropodial setæ of II differ very little from the normal types in typical parapodia, except for their smaller size and longer spines. I bears no neuropodials, and in the specimen examined only two notopodials, which have the characteristic form.

The elytra are pale mottled brown, the setæ all a pale but glistening hay color. The dorsum of the body is light brown, with a yellowish line across the anterior end of each somite and the anterior somites each with a median spot of dark brown. The bases of the parapodia are pale yellowish, the cirri white with dark rings above and below the enlargement. The head is light-colored and iridescent with brown cloudings, the base of the tentacles chocolate color, and the palps buff. The under surface of the body is pale and iridescent.

One specimen. McCormick Bay, P. R. E.

Lagisca rarispina (Sars) Malmg.

The anterior pair of eyes is borne on the anterior face of prominently outstanding lobes, which give to the head a very characteristic form not shown in any of the published figures. These ocular lobes are situated slightly posterior to the middle of the head, which is very much narrower anterior than posterior of them. A specimen 12 mm. long has only seven somites posterior to the last elytraphore, whereas one of 43 mm. has fifteen.

McCormick Bay, Dr. Benjamin Sharp; Northumberland Island, O. 11, 10–15 fath.; Olridir Bay, O. 29 and 49, 7–25 fath.

Actinoë sarsi Kinb.

McCormick Bay, P. R. E.; Granville Bay, O. 39, 30–40 fath.; Olridir Bay, O. 49, 15–20 fath.

Harmothoë imbricata (Linn.) Malmg.

This species occurs in considerable numbers and from many localities, most abundantly in material gathered in shallow water. The examples from McCormick Bay are of large size, and the setæ are nearly black instead of the usual rich amber color; the elytra also are marked with nearly black spots. Many varieties, both in color and structural features, are represented. The elytra vary from those without any trace either of horny papillæ or soft marginal papillæ, to very rough ones with numerous hard prominences easily visible under a magnification of five diameters and soft papillæ so close together that they crowd one another in the marginal rank.

McCormick Bay, Dr. Sharp; Godhavn, Dr. Hayes, Godhavn, O. 2, 8 fath.; Saunders Island, O. 9, 5–10 fath.; Barden Bay, O. 45, 10–40 fath.; Orlidir Bay, O. 49, 15–20 fath.; Robertson Bay, O. 52, 5–15 fath.; Foulke Fjord, O. 54, 5 fath.; Sarkak, O. 57, 9 fath.

Harmothoë (Lænilla) glabra (Malmg.).

McCormick Bay, P. R. E. and Dr. Sharp; Northumberland Island, O. 11, 10–15 fath.; Barden Bay, O. 45, 10–40 fath.

Harmothoë (Evane) impar (Johnston).

The single specimen from McCormick Bay is typical. In this the soft marginal papillæ have the rounded form shown by Malmgren, not the truncate and lobulated appearance of McIntosh's figures. The hard papillæ are mostly elevated and divided at the summit into two short, blunt divergent processes. The other specimens are referred doubtfully to this species, from typical examples of which they differ in the following details: The median and lateral tentacles and the tentacular cirri have the tapering and filamentous portion relatively longer than in McIntosh's figure; the scales are rougher, with spinous-tipped horny papillæ and few cilia, of which the longer ones have bulbous ends; four examples lack the large, soft papillæ altogether, while the fifth one bears a single minute one on one scale only; the neuropodial setæ have the spinous tip longer and the accessory process nearer to the extreme end.

McCormick Bay, Dr. Sharp; Saunders Island, O. 9, 5–10 fath.; Olridir Bay, O. 49, 15–20 fath.

Harmothoë (Eunoa) nodosa (Sars) Malmg.

Two examples approach nearer to *Eunoa œrstedi* in many respects. The distinctness of these two species has been already called in question, but is generally upheld by the highest authorities. The scales exhibit the dense external ciliation of *E. nodosa*, but are rougher even than *œrstedi*. The large papillæ are spinous at the apex, and many even of the smaller ones, especially toward the outer margin, bear a number of conical or bifid divergent spines. Around the posterior margin, and more or less elsewhere, many of the papillæ become low, rounded and mound-shaped, and bear numerous small spines in clusters. Anteriorly the roughness of the scales increases and a detached scale, which, being circular, is regarded as the first, bears around its entire margin a narrow band of large, irregularly globoid bosses, produced into numerous processes, each of which bears a tuft of spines at its summit. A smaller group occurs at the middle of the scale and papillæ of smaller size are scattered between. All of these papillæ are hard and horny and supported on horny basal plates of various and irregular shapes.

The ventral setæ have the form figured by McIntosh, and the dorsal also resemble his figure of *E. nodosa*, except that the short tips are sculptured in much the fashion of the smaller notopodial setæ of *Harmothoë truncata*. They resemble the apex of the green fruit of *Liriodendron* or a winter leaf-bud, but are less regular and the smaller ventral ones especially have fewer scales or ridges. The ventral setæ of II resemble McIntosh's figures of *œrstedi* rather than *nodosa*.

Several discrepancies appear in the published accounts of the species of *Eunoa*. Malmgren figures the smooth tips of the notopodial setæ of *nodosa* as the longer of the two species; McIntosh both describes and figures the reverse, but neither indicates the sculpturing. McIntosh in one place[1] (p. 292) describes segmental papillæ in *Eunoa*, in two other places (pp. 291 and 293) he states that they are absent. In these specimens they are nearly as well developed as in *Harmothoë imbricata*, for example.

The head and its appendages conform almost exactly to McIntosh's figure. The anterior eyes are quite dorsal in position, situ-

[1] *Monograph of British Annelida*, Part II.

ated well posterior and but little farther separated than the posterior pair.

In many respects these specimens resemble the figures of *Harmothoë scabra* (Oersted), especially those of the scales given by Wirén.[2] The anterior elytra of *Polynoa* (*Harmothoë*) *islandica* Hensen also approach the character of these, but the entire absence of those belonging to the posterior region renders it impossible to determine if they possess the peculiar ragged appendages present in Hensen's species, in which also the first elytron is reniform.

McCormick Bay, P. R. E.

Harmothoë (Eunoa) truncata sp. nov.

This well-marked species is known only from a single imperfect specimen, consisting of the head with twenty-four somites. The elytra, dorsal cirri, all but one tentacular cirrus and the tentacles are missing. Viewed from beneath the body is truncate anteriorly, widest at V or VI, and with nearly parallel sides, narrowing very gently posteriorly. The third and fourth somites together form a broad swollen area which bounds the mouth posteriorly. Rather prominent but short, projecting nephridial papillæ begin at VI, and continue to XXIV at least. Scars for the attachment of elytra are present on the usual somites back to XXIII.

The head is slightly broader than long, with a well-marked median anterior fissure and slightly produced, obtusely pointed peaks. A small posterior nuchal lobe is inseparably connected with the head, but by analogy probably belongs to the following somite. The two pairs of eyes are black, circular and of equal size. The posterior are close to the posterior margin, and are separated by a space of five times their diameter. The anterior are placed laterally on the widest region of the head, and distant about twice their diameter from the tips of the cephalic peaks. There is nothing peculiar in the place of origin of the tentacles. The palpi are about five times the length of the head, with a swollen basal half, a slender distal half and a short terminal filament.

In the typical foot the neuropodium has nearly straight outlines terminating at a nearly right angle, with a projecting acicular lobe. The aciculum projects but little and its end is suddeny contracted in a peculiar way. The notopodium lies a little to the anterior of

[2] *Vega-Expeditionens Vetenskapliga Iakttagelser*, II.

the plane of the neuropodium, but scarcely overlaps it. Its aciculum projects farther than the neuropodial, like which it is suddenly narrowed at the end.

The neuropodial setæ (Pl. XIV, figs. 21, 22) are grouped in eight rows, of which five are ventral, two dorsal and one opposite to the aciculum. They are of large size, the longest dorsal ones about equaling the longest notopodials in length. Like the latter they are stout. The spinous portion is relatively short, but there is the usual increase in length dorsad. On a typical seta from the middle of a bundle the five or six terminal pairs of spines are of large size, little or not at all divided and with no lateral fringes. They rapidly diminish in size and become finely ctenoid as the fringes appear, and soon become continuous with the latter. Proximally the spines become very fine and the rows crowded. On the dorsalmost setæ the number of fine rows increases and the transition from the coarse to fine is much more gradual. The number of spinous rows is about fourteen in the ventral, nineteen on the middle and thirty on the dorsal setæ. On all of the neuropodial setæ the smooth tip is long, simple, strongly hooked and sharp-pointed. On the ventral setæ it nearly equals in length the spinous region and even on the dorsal ones is about one-third as long.

The largest of the notopodial setæ (Pl. XIV, figs. 23 and 25) are remarkable for their size and truncate ends. They are long, stout, slightly curved and bear for fully one-half of their exposed portions numerous close and long rows of excessively fine teeth, which are frequently worn away over considerable areas. Except near the tip they extend nearly around the shaft. The tip has a peculiar frayed-out appearance, as though the fibres of the setæ had separated and spread apart. The peripheral layer is a whorl of elongated scales surrounding a fibrous bundle, from the midst of which a central point appears more prominently. Around the base of these scales is a very dense fringed whorl. The very large setæ are few in number, not more than eight or ten in a bundle.

The most usual form of the seta tip is shown in fig. 27. In such the outer scales embrace the central style more closely, so that a rough, blunt point is formed. Somewhat similar are the tips of the strongly curved antero-dorsal setæ (Pl. XIV, figs. 24 and 26), but these have very short scales. The slender, sharp-pointed anterior ventral setæ (Pl. XIV, fig. 28) approach more nearly the

usual type of notopodial setæ found among the polynoids, but even these have the points somewhat divided. On the extreme anterior feet all of the dorsal setæ are blunt-pointed, having much the appearance of the conventional architectural pineapple. The first foot bears a group of five or six setæ of this type and no neuropodials. The neuropodials of the second foot are slender, tapering and provided with very long spines.

One specimen. McCormick Bay, P. R. E.

Melænis loveni Malmg.

McCormick Bay, Dr. Sharp; one specimen.

Pholoë minuta (Fabr.) Malmg.

Godhavn Harbor, O. 2, 8 fath.

Phyllodoce citrina Malmg.

Northumberland Island, O. 11, 10–15 fath.; one specimen.

Phyllodoce greenlandica Oersted.

Barden Bay, O. 45, 10–40 fath. Some fine examples, the largest measuring 390 mm.

Phyllodoce mucosa Oersted.

Foulke Fjord, O. 54, 5 fath. Three specimens, all of which exceed Oersted's original examples in length. The largest measures 94 mm.

Autolytus longisetosus Oersted.

Cape Chalon, O. 25, surface.

Nereis pelagica Linn.

Godhavn, Dr. Hayes.

Nereis zonata Malmg.

Granville Bay, O. 39, 30–40 fath.; one specimen.

Lumbriconereis sp.

McCormick Bay, P. R. E., 10 fath. A fragment of a large individual of an undetermined species.

Northia conchylega (Sars) Johnson.

This species must be extremely abundant at some points, as at Olridir and Granville Bays. The characteristic tubes are flattened and of an elongated rectangular form, measuring up to 80 mm. long, 10–12 mm. wide and 3 mm. thick. The lumen is about twice as wide as high, and is completely filled by the worm. Judging from the fact that attached tubes of *Spirorbis*, *Serpula*,

together with bryozoans, tunicates and hydroids are confined chiefly to one side, it is probable that they are fixed to the bottom, resting on one of the flat surfaces. The material of which they are composed differs with the character of the bottom. Those from Olridir Bay are uniformly formed of coarse grains of red, black, yellow and colorless sand, with here and there a small lamellibranch shell or a fragment of a larger one. The Granville Bay examples, on the other hand, are composed of flattened pieces of black or occasionally gray shale, with numerous large pieces or even entire shells, bits of sea urchin tests, etc. Many of the bits of shell are very thin and translucent (like *Anomia*), permitting the form of the worm to be distinctly seen. In many cases the fragments of shale are as much as 15 mm. in diameter, and the pieces of shell are still larger.

Granville Bay, O. 39, 30–40 fath., and O. 40, 20–30 fath.; Olridir Bay, O. 49, 15–20 fath.

Scalibregma inflatum var. **corethura** Mich.

Whale Sound, O. 41, surface.

Flabelligera affinis Sars.

Cape York, O. 34, 10 fath.

Flabelligera infundibularum Johnson.

This species, recently described by H. P. Johnson from the Puget Sound region, is represented by one specimen which differs slightly from the Pacific coast examples. The capillary setæ have a greater number of cross nodes, the infundibular setæ appear to be somewhat shorter, and the stalked sense organs have a different form, which, however, is probably merely the result of a different state of preservation.

McCormick Bay, Dr. Sharp.

Axiothea catenata Malmg.

Barden Bay, O. 45, 10–40 fath.

Cistenides granulata (Linn.) Malmg.

Godhavn Harbor, O. 2, 8 fath., and O. 3, beach; Sarkak, O. 57, 9 fath.

Cistenides hyperborea Malmg.

Barden Bay, O. 45, 10–40 fath.

Amphitrite cirrata Müller.

Barden Bay, O. 45, 10–40 fath. A few tubes of an *Amphitrite* were also dredged at Foulke Fjord, O. 12, 35 fath.

Nicolea arctica Malmg.

Very abundantly represented in the collections from Northumberland Island. Melville Bay, O. 6; Northumberland Island, O. 11, 10–15 fath.

Scione lobata Malmg.

Granville Bay, O. 39, 30–40 fath.; Barden Bay, O. 45, 10–40 fath.

Axionice flexuosa (Grube) Malmg.

Saunders Island, O. 9, 5–10 fath.; Granville Bay, O. 39, 30–40 fath.

Thelepus circinnatus (Fabr.) Malmg.

Next to *Harmothoë imbricata*, this species occurs most frequently in the collections of Dr. Ortmann. It is not represented in the material from McCormick Bay.

Godhavn, Dr. Hayes; Godhavn Harbor, O. 2, 8 fath.; off Cape Chalon, O. 27, 35 fath.; Foulke Fjord, O. 32, 14 fath.; Granville Bay, O. 39, 30–40 fath.; Olridir Bay, O. 49, 15–20 fath., Robertson Bay, O. 51, 35–40 fath.; Karnah, O. 50, 30–40 fath.

Chone infundibuliformis Kröyer.

Olridir Bay, O. 29, 7–25 fath.

Serpula sp.

Tubes of a small *Serpula* were found attached to the tubes of *Northia conchylega* from Olridir Bay and other places.

Spirorbis granulatus (Linn.) Mörch.

Found only attached to the tubes of *Northia conchylega* and *Thelepus circinnatus*, and especially abundant on the former in Olridir Bay. A number of examples were noticed in which the last turn of the tube was elevated and free. The thick tube is sometimes marked with one, sometimes with two, longitudinal angular ridges; these become quite evident in young individuals of .5 mm. diameter.

Foulke Fjord, O. 32, 14 fath.; Granville Bay, O. 39, 30–40 fath.; Olridir Bay, O. 49, 15–20 fath.

Spirorbis verruca (Fabr.) Mörch.

Found only with the last, than which it is less common, attached to the tubes of *Northia*. Specimens measuring 7 to 8 mm. across the spiral were found.

Spirorbis spirillum (Linn.) Mörch.

In addition to the typical open spiral form there have been referred to this species numerous examples which, while having, so far as could be determined, identical characters of setæ, operculum, etc., have the tube usually coiled in a flat spiral of smaller size and less pellucid character. This form occurs abundantly in comparatively shallow waters, attached in the manner of *Spirorbis borealis*, from which the tube is distinguished at once by the reverse direction of its coil, to *Laminaria* and other resistant thalloid algæ. When attached to a clean surface of the alga the plane of the spiral is always perfectly flat; when, however, as frequently occurs, the annelid is associated with an incrusting growth of bryozoans, the coil of the former immediately becomes elevated and open, approaching the typical form which is found in deeper waters associated with hydroids and branching bryozoans. As noted by Michaelsen, this species reaches a much larger size than has been recorded by Levinsen and other students of Arctic Polychæta. One of the largest examples, occurring in the collections from Olridir Bay, measures 8.5 mm. in height of the spiral. The typical form is represented from the following localities: South of Cape Alexander, O. 26, 27 fath.; Olridir Bay, O. 49, 15–20 fath.; Karnah, O. 50, 30–40 fath.; Robertson Bay, O. 51, 35–40 fath. The flat form occurs as follows: Upernavik, O. 4, 5–10 fath.; Saunders Island, O. 9, 5–10 fath.; Northumberland Island, O. 11, 10–15 fath.; Robertson Bay, O. 51, 5–15 fath.; Foulke Fjord, O. 54, 5 fath.

Spirorbis vitreus (Fabr.) Mörch.

A single example attached to the tube of a *Northia conchylega* from Foulke Fjord, O. 39, 14 fath.

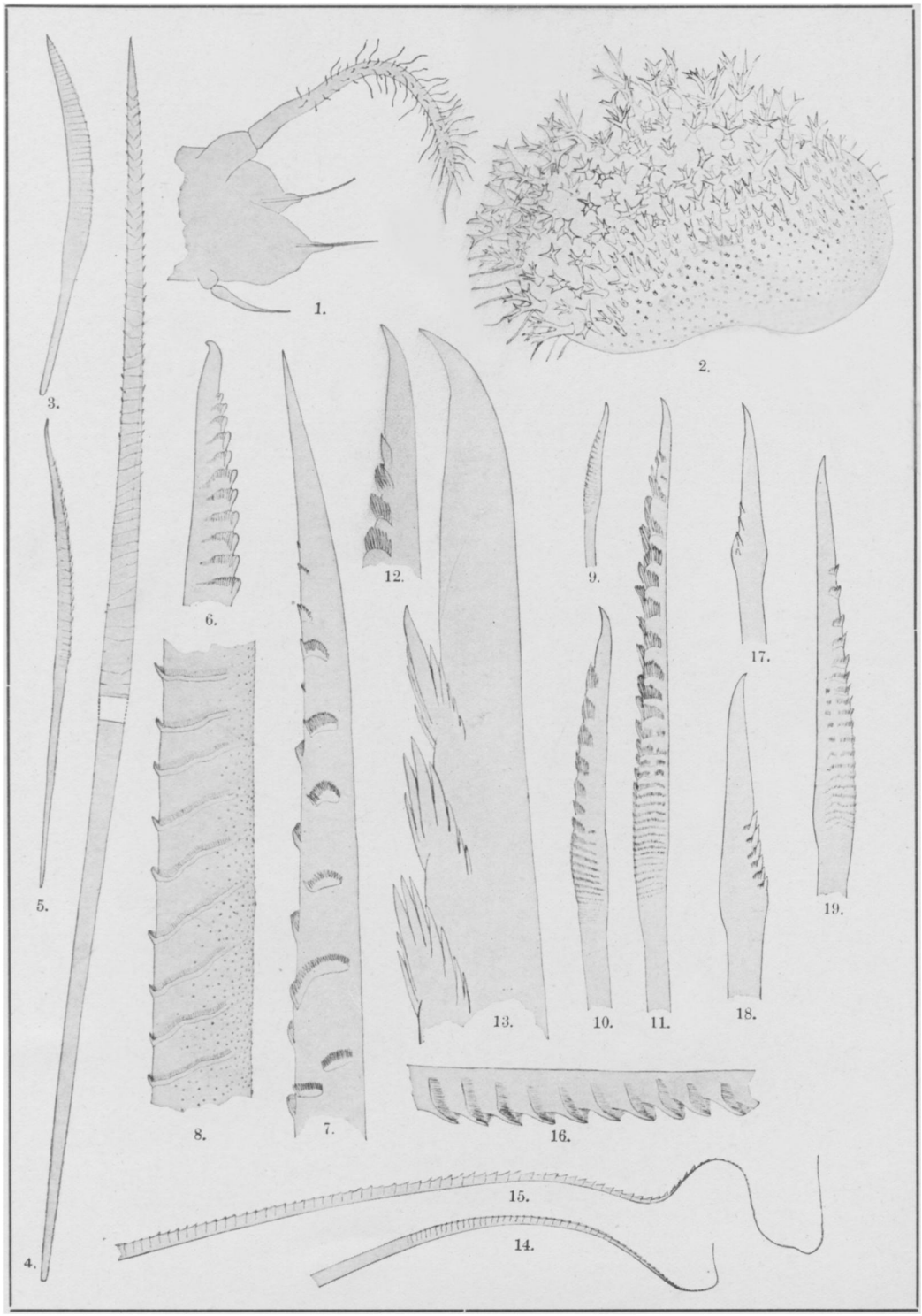
EXPLANATION OF PLATES XIII AND XIV.

PLATE XIII.—*Gattyana senta :*

Fig. 1.—Outline of the right parapodium, without setæ, of X ; posterior aspect. × 14.
Fig. 2.—Right elytron of XIII. × 14.
Figs. 3-5.—Dorsal, middle and ventral notopodial setæ, respectively, from the left parapodium of X. 12 mm. have been cut out of the drawing of the middle setæ to permit of its being shown entire on the same scale as the others. × 75.
Fig. 6.—Tip of dorsal notopodial ; left, X. × 335.
Figs. 7 and 8.—Tip and basal portion of middle notopodial, respectively ; left, X. × 335.
Figs. 9-11.—Tips of ventral, middle and dorsal neuropodial setæ, respectively, from the left parapodium of X. × 75.
Figs. 12 and 13.—Extreme tips of the ventral and middle setæ shown in figs. 9 and 10 respectively. × 335.
Gattyana ciliata :
Figs. 14 and 15.—A dorsal and a middle notopodial seta from X. × 75.
Fig. 16.—A portion of a typical notopodial seta. × 335.
Figs. 17-19.—Tips of ventral, middle and dorsal neuropodial setæ, respectively, from X. × 75.

PLATE XIV, fig. 20.—A typical elytron of *Gattyana ciliata.* VII, right. × 14.

Harmothoë truncata.—All setæ are from the right foot of X :
Fig. 21.—Typical middle neuropodial. × 75.
Fig. 22.—A portion of the same seta. × 335.
Fig. 23.—A large middle notopodial. × 75.
Fig. 24.—A dorsal notopodial, entire. × 75.
Fig. 25.—Tip of a large middle notopodial. × 335.
Figs. 26-28.—Smaller dorsal, middle and ventral notopodials respectively. × 335.
Lagisca multisetosa.—All setæ are from the right parapodium of X :
Fig. 29.—A typical anterior elytron. × 14.
Fig. 30.—A small portion of the middle of the dorsal surface of the same. × 75.
Fig. 31.—A small portion of the posterior margin of the same. × 75.
Fig. 32, *a*, *b* and *c*.—Ventral, middle and dorsal neuropodials. × 75.
Figs. 33 and 34.—Tips of ventral and dorsal neuropodials. × 335.
Fig. 35.—A middle notopodial. × 75.
Fig. 36.—Tip of the same. × 335.



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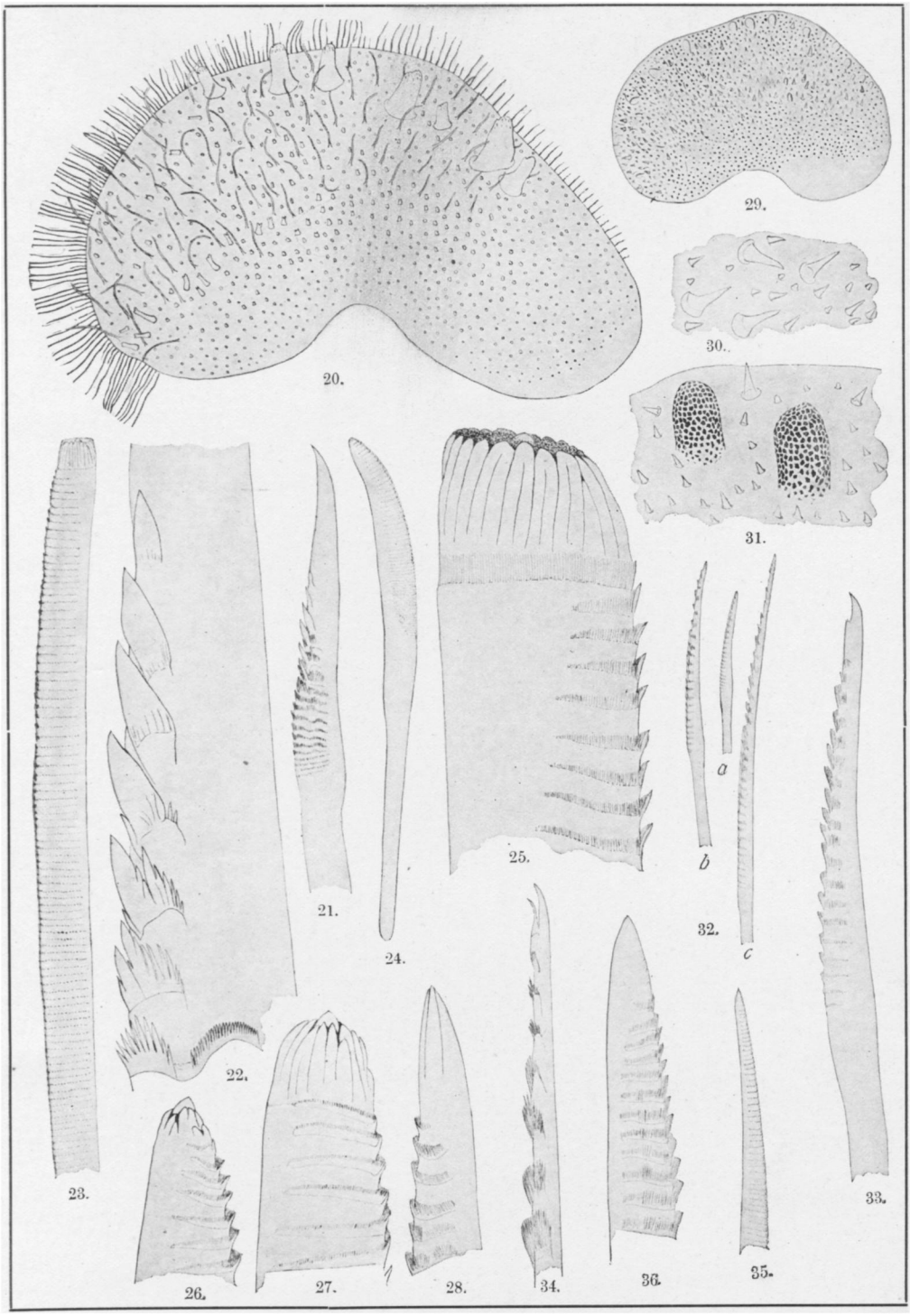

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